Learning to Care for Those in Harm's Way

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For Immediate Release:

Successful Vaccine Developed Against Deadly Nipah Virus, Scientists Report

Bethesda, MD — A major breakthrough in the development of a highly effective vaccine against the deadly Nipah virus has been reported by a team of federal and university scientists. The results of their study, "A Hendra virus G glycoprotein subunit vaccine protects African green monkeys from Nipah virus challenge," appears in Science Translational Medicine online.

The research team members are a collaborative group of investigators from the Uniformed Services University of the Health Sciences (USU), the University of Texas Medical Branch (UTMB) and Galveston National Laboratory (GNL), the National Institutes of Health (NIH's) National Institute of Allergy and Infectious Diseases (NIAID) and Rocky Mountain Laboratories (RML), and the Boston University School of Medicine and National Emerging Infectious Diseases Laboratories Institute (NEIDL). The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., provides technology transfer assistance in protecting the Nipah and Hendra virus vaccine developed at USU.

Nipah virus and Hendra virus emerged in the 1990s causing serious disease outbreaks in humans and livestock in Australia, Malaysia, Singapore, Bangladesh and India. Recent Nipah outbreaks have resulted in acute respiratory distress syndrome and encephalitis, person-to-person transmission, and greater than 75 percent case fatality rates among humans. The viruses are found naturally in several species of Pteropid fruit bats (flying foxes). The NIH and Centers for Disease Control and Prevention have classified Nipah and Hendra as biothreat agents, and the U.S. Department of Agriculture has characterized them as agriculture threat agents. In fact, the infectious agent of the recent cinematic release "Contagion" was modeled after Nipah virus.

In experiments carried out in African green monkeys at the RML in Hamilton, Mont., where there is a high-level safety and security facility for working with live Nipah virus, the team of researchers, under the direction of Heinz Feldmann, M.D., Ph.D., chief of the RML, Laboratory of Virology, demonstrated that immunizing monkeys with a vaccine based on the Hendra virus attachment G glycoprotein afforded complete protection against Nipah virus infection with no evidence of disease.

"These findings are really quite promising and appear to offer a real potential treatment for Hendra virus infection in people," said Christopher C. Broder, Ph.D., professor of Microbiology at USU and study corresponding author.

The vaccine is a soluble portion of the G glycoprotein of Hendra virus, known as Hendra-sG, which mediates viral infection and is produced in the laboratory using molecular techniques. Lead author, Katharine Bossart, Ph.D., a USU alumna and assistant professor in the Department of Microbiology, Boston University School of Medicine, developed the Hendra-sG vaccine while a student in Dr. Broder's laboratory at USU. "Since the vaccine is only a recombinant piece of the virus, it can be produced by itself and purified, and is a type of vaccine known as a subunit, thus making it extremely safe to use," Dr. Bossart said.

According to study co-author Thomas W. Geisbert, Ph.D., professor in the Department of Microbiology and Immunology at UTMB and GNL, "This work now provides key evidence that a simple and safe recombinant vaccine against Nipah virus is possible. Demonstrating this in a nonhuman primate model is a major step forward in developing it for future therapeutic use in people."
Major support for the current study came from the NIAID, NIH, including grant U01-AI082121 awarded to Dr. Geisbert and R01-AI054715 to Dr. Broder.

"There are currently no approved vaccines for prevention of infection and disease caused by Nipah and Hendra for use people or livestock," Dr. Broder said. "The vaccine had previously shown protection in ferrets against Hendra virus infection, and in cats against Nipah virus infection. In addition, the Hendra-sG vaccine has been trialed in horses against Hendra virus in Australia where it has demonstrated complete protection against illness and infection. Demonstrating its potential as a safe and effective vaccine in monkeys is an important step toward being licensed for possible use in people."

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About USU

The Uniformed Services University of the Health Sciences is the United States' federal health sciences university. USU students are primarily active duty uniformed officers in the Army, Navy, Air Force and Public Health Service who have received specialized education in tropical and infectious diseases, preventive medicine, the neurosciences (to include TBI and PTSD), disaster response and humanitarian assistance, and acute trauma care. A large percentage of the university's nearly 5,000 physician and 500 advanced practice nursing alumni are support operations in Afghanistan, Africa and elsewhere, offering their leadership and expertise. The University also has graduate programs in biomedical sciences and public health, open to civilian and military applicants, committed to excellence in research which have awarded more than 375 doctoral and 800 masters degrees to date. For more information about USU and its programs, visit www.usuhs.mil.